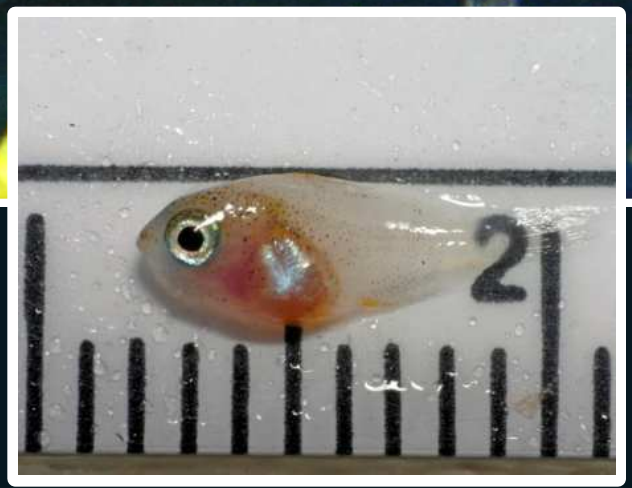
A Reefs.org Publication

April 2008
Volume VII, Issue IV
ISSN 1931-6895

Advanced Aquarist's Online Magazine



Aquarium Emergency Protocols
Breeding the Golden Damselfish
Conspicuous Angelfish

photographs by Todd Gardner

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Golden Damselfish, *Amblyglyphidodon aureus* (main); 15 day old Golden Damselfish larvae (inset). Photographs by Todd Gardner (main) and Chris Paparo (inset).

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Reprints

Back issues are available for reading and download at
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Publisher

Pomacanthus Publications, Inc.

Publication Information

Advanced Aquarist's Online Magazine (ISSN 1931-6895) is published monthly online by Pomanthus Publications, Inc. A central goal of this publication is to promote exchange between the scientific community and amateur aquarists, for the benefit of both disciplines and the environment. To achieve our combined goals of greater understanding of the natural world and honing our husbandry skills we will rely heavily on science and scientists. Advanced Aquarist's Online Magazine will always emphasize protection and understanding of the natural environment.

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ADVANCED AQUARIST'S ONLINE MAGAZINE

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EDITORIAL

April 2008

By Terry Siegel

Terry discusses his Thailand trip a bit more as well as an upcoming article in Advanced Aquarist.

Published April 2008, Advanced Aquarist's Online Magazine.

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Keywords (AdvancedAquarist.com Search Enabled): Editorial, Terry Siegel
Link to original article: http://www.advancedaquarist.com/2008/4/aaeditorial

Last month I wrote about my trip to Thailand, and the beautiful coral gardens in the Andaman Sea surrounding the beautiful island Ko Phi Phi. This month I want to mention a short long boat trip I took to an island off of the coastal city Krabi, Thailand. See photo1! Although I brought with me my mask and snorkel I was initially disappointed by what appeared to be barren sand surrounding this small island. Looking around I thought to myself: too much human activity for coral to survive.

However, I decided to snorkel around anyway, and much to my surprise I discovered innumerable homes for shrimp gobies in only a few feet of water at low tide. For awhile I amused myself by chasing the goby back into its burrow, and then watching the shrimp bulldoze the debris out of their hole that had rolled in due to the fishes' rapid retreat. Here is a picture of the duo that I scanned from an old Scuba magazine. See photo2! The complex communication that goes on between the shrimp and fish is quite fascinating and has been extensively studied by marine biologists. If interested in this wonderful relationship check out the following link: http://www.explorebiodiversity.com/Hawaii/Shrimp-goby/general/Warning%20Communication.htm.

The May issue of *Advanced Aquarist* will have an article by Sanjay Joshi on his technique for photographing his captive corals.

Photo 1

Sanjay posted many photographs on our bulletin boards using his technique, and they were some of the best photos I have ever seen. Here is a photo taken from our boards as an example:

Sample photo from an upcoming article by Sanjay Joshi. Photo by Sanjay Joshi.

Photo 2

FEATURE ARTICLE

EMERGENCY PROTOCOLS FOR HOME AQUARIUMS

By Jay Hemdal

While this article cannot solve every aquarium emergency, it hopefully gives some ideas that can be implemented with little cost which may pay big dividends in saving the lives of aquarium animals.

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Keywords (AdvancedAquarist.com Search Enabled): Equipment, Feature Article, Jay Hemdal, Emergency
Link to original article: http://www.advancedaquarist.com/2008/4/aafeature1

Many people speak of the importance of being prepared for any "unforeseen situations" with their aquariums. This is actually better stated as preparing for "unwelcome situations" - as all of these situations can be planned for because you should be aware they could happen. Truly unforeseen situations only occur to unprepared people that lack an overall knowledge of aquariums. For instance, it might be unforeseen by a beginning aquarist that a heater that sticks in the on position will raise the water temperature and possibly kill their fish. For an experienced aquarist, the potential for this problem is known, and it then becomes an unwelcome situation if it occurs. With the complexity of aquariums growing, (especially reef tanks) the issue of properly handling emergencies becomes of paramount importance. You should compare aquarium emergency pre-planning to having insurance, but unlike home and auto insurance, nobody is going to mandate aquarium preparedness for you.

All aquarists should be reasonably prepared to preserve the lives of the organisms in their care should some disaster strike. The two points at the heart of this issue is the personal responsibility for the animals in the aquarist's care, and the animal's replacement cost should anything happen to them. To be perfectly frank, aquarists do need to perform a cost-benefit analysis on the potential emergency protocols that they intend to implement. Having no plan is of course the least expensive option - but obviously offers no protection at all. On the other hand, having complete equipment redundancy with automatic back-up power supplies could cost many times more than the animals themselves. Each aquarist needs to determine the risk level that they feel comfortable with. Remember though that you are dealing with the lives of animals that you are solely responsible for, so the effort given towards emergency planning needs to be done with that in mind, not just the replacement cost of the animals.

Just how widespread is the issue of aquarium emergencies? Obviously, we all know the potential is there to lose animals due to emergencies, but how common of a problem is it? In one online poll, 38 percent of a group of marine aquarists reported having lost animals due to a power failure. This is significant in that many more aquarists had experienced problems, but were able to manage the issue without loss of animals. It seems then that it is safe to assume that if you stay active in the aquarium hobby long enough, you will experience an emergency with your aquarium at some point.

TYPES OF EMERGENCIES

Power outages are perhaps the most commonly experienced aquarium emergency. Most marine aquariums develop low dissolved oxygen problems within a few hours of the power going out. During the winter, loss of power may also cause problems with low water temperatures. There are a variety of resources discussed later that mitigate the problems caused by power disruptions.

Fires can be devastating to aquariums. Obviously, aquariums will be damaged if exposed directly to the heat or flames from a fire, but even a small kitchen fire can kill aquarium inhabitants due to exposure to smoke. Assuming there is no immediate threat to humans, emergency procedures to prevent smoke damage include temporarily isolating the aquarium by turning off filters and air pumps and sealing the entire aquarium in plastic sheeting. Smoke can further be excluded by then setting up a large air pump or blower outside the smoke-filled area to blow fresh air into the "isolation tent" made of plastic sheeting.

Equipment failure is also a common causes of aquarium emergencies. A stuck float switch or check valve can disable an aquarium's life support system in a matter of seconds. A seized circulating pump may cut off all water flow to an aquarium. Heaters that stick on or off will cause disruptions in the aquarium's water temperature. Catastrophic water loss through a plumbing failure or a

A natural gas genset used by a public aquarium for 25 years.

tank leak can be devastating to the animals as well as causing water damage to the home. With very large glass aquariums, especially homemade ones, the question is usually not "will the tank leak?" but "when will it leak?"

Averting the Most Common Disaster of All!

The most important device to reduce animal loss in an aquarium is a quarantine tank and a comprehensive system to quarantine all new arrivals. It truly is a disaster to introduce a new specimen into your aquarium and bring in a disease at the same time.

Any natural disaster that affects a person's home will have an impact on their aquariums. One story goes that Indo-Pacific lionfish having found a new home in the Atlantic Ocean could have possibly arisen from lionfish swept from their aquariums in Miami out into Biscayne Bay by hurricane Andrew.

There is one category of emergency that doesn't quite fit with the topic of this article - when a human health emergency is caused by an aquarium animal. These are cases where the aquarium itself is in no jeopardy, but the aquarist has been injured by one of their animals. Know the relative health risks of all of your aquarium animals and avoid any species that can cause serious human health problems, especially in homes with children.

The life support criteria that must be managed during an emergency include dissolved gasses (primarily oxygen), light (for corals), temperature, and in long-term emergencies, nitrogenous wastes. There are a variety of methods available to help an aquarist maintain life support systems. Some are just temporary or partial fixes, and the cost can vary greatly between methods. A lesson in pre-planning can be taken from public aquariums that certainly have a need for emergency life support systems for their valuable aquatic exhibits. The Association of Zoos and Aquariums, a member organization that accredits many of these facilities has standards for their members that addresses this issue. First, all AZA members must have written emergency protocols, and then use them to conduct periodic drills. AZA member institutions must also have warning systems such as fire alarms and emergency lighting in place to alert for a failure in any of their aquatic life support systems. In addition, the AZA requires that "emergency backup systems must be available" for the life support systems. Many public aquariums use large auxiliary generators with automatic transfer switches to serve this purpose. What does all this mean for home aquarists? Simply put, anything that is such a high priority with professional aquarists must be considered important for serious home aquarists as well.

Possible solutions

Uninterruptible Power Supply (UPS)

Commonly used to maintain computer operations during short term power disruptions, a UPS system's greatest attribute is that it automatically switches on when the power goes out. Remember that by design, a UPS unit only needs to power a computer long enough for the user to save their work and shut the computer down. For that reason, the battery bank in a UPS may not have much capacity. Except for the smallest aquariums, a UPS device should really only be relied upon to run a small pump or to maintain power to any computer controls on the aquarium that might lose their memory during a power outage.

Power inverter

Having a power inverter can be very helpful in some instances. These devices convert 12 volt direct current to 115 volt alternating current that can then be used to power aquarium equipment. Like generators, these devices have power ratings for peak and continuous usage, so be sure that your expected total wattage will be less than 80% of the converter's continuous rating.

A 150 watt inverter may cost $20 to $30 and can run basic life support for small to medium aquariums. For $10 you should be able to find a 40 watt inverter that can power a small air pump and maybe even a small circulating pump. It is often recommended not use an inverter rated higher than 300 watts if it plugs into a cigarette lighter socket as it may cause the vehicle's fuse to blow. Inverters with a capacity of greater than 1000 watts may require high output alternator and banked batteries (as might be found in a recreational vehicle). Some electronic devices will only work with inverters that produce what is termed "true sine wave" electricity, so check with the manufacturer for the specific needs of your equipment.

Generators

The primary emergency electrical system for most homes and businesses is an electrical generator that runs on fuel (gasoline, diesel or natural gas). These devices range in size from tiny 600 watt portable units to whole-building generators with automatic transfer switches. When sizing a generator for your needs remember that pumps and chillers all require a peak starting power greater than their rated wattage while running. Advice from an electrician should be sought when planning a power generation system using large generators.

SCUBA tank

Enterprising aquarists who are also divers may want to rig a device that will aerate their aquariums from a SCUBA cylinder. Using the first stage from an old regulator, the LP hose can be attached to a needle valve that can handle the rated pressure of around 150 psi. From the needle valve, a standard aquarium airline runs into the tank ending with an airstone. Simply cracking open the SCUBA tank valve will aerate the aquarium for at least two hours. Periodically closing the valve can extend the life of the air in the cylinder ten-fold. Anyone with access to a medical or welding oxygen cylinder can rig a similar, but much more effective aeration system.

Emergency cooling methods

Adding ice to an aquarium is one possible solution to high water temperatures resulting from a chiller failure. In marine aquariums the ice must be isolated from the seawater either by a plastic bag, or by freezing water beforehand in two-liter plastic soda bottles. The most important question is, "How much ice will be needed?" The best way to answer this question is to run a quantitative test before you experience an actual failure of the life support system. Prepare a series of ice blocks or frozen two liter bottles of water. Then, disconnect the chiller or turn off the air conditioning and add measured amounts of ice to the aquarium and record the results. As long as some ice remains, do not add more. As the ice melts fully in each container, remove it and

replace it with another frozen one. Monitor the water temperature during this process, adding more ice if the temperature rises and removing some if the temperature drops too far. Run this test for 4 to 6 hours and then calculate the amount of ice it took to maintain a stable temperature and divide by the numbers of hours. This number will be the amount of ice you will need to keep the aquarium at a proper operating temperature for the period of the expected equipment failure or power outage. To put this in perspective, in one actual test 4 pounds of ice was found to hold a 30 gallon aquarium at its set temperature (25 degrees below ambient) for three hours. It took 8 pounds of ice to hold a 120 gallon aquarium 25 degrees below ambient for three hours. A 500-gallon concrete tank was held at 15 degrees below ambient for 2 hours with 22 pounds of ice (Hemdal 2006).

Another method of emergency cooling that works especially well if the temperature does not need to be lowered too much is to use cool tap water running through 50 to 100 feet of vinyl tubing immersed in the aquarium or its sump, with the hose output running to a drain. Turning the tap water flow rate up or down will serve as a rough way to adjust the aquarium's water temperature - a type of cooling coil.

An automatic generator transfer switch at a public aquarium.

Maintaining Hydration

In cases where the aquarium has leaked or the plumbing has failed, the animals may be exposed to the air and will soon die if not rescued. For fish and macro-invertebrates, the solution will be to move them to a container housing enough seawater to keep them alive until the situation can be resolved. This may be something as simple as temporarily moving these animals to the aquarium's sump.

What about an aquarium filled with corals and live rock? One often overlooked answer to this problem lies in a roll of paper towels. Corals can survive for varying lengths of time out of water if kept from drying out completely. In fact, some live corals are routinely shipped "damp" wrapped in plastic sheeting or even damp newspaper. Soaking paper towels in seawater and then draping the towels over corals and live rock will keep them alive for anywhere from four to perhaps as long as 36 hours. Covering the top of the aquarium with plastic sheeting and/or ladling fresh seawater on the paper covered corals can extend the time they can survive out of water.

Chemical Additives

There are cases where basic life support systems can be maintained, but some water quality parameters begin to fail anyway. For example, in a long-term power outage, fish life may be saved by some device, but the corals begin to die due to lack of light or some other factor. In these cases, nitrogenous wastes (ammonia) must be managed. There are a few ammonia neutralizing chemicals on the market, and should be a part of every aquarists "medicine chest". Some aquarists have experimented with using hydrogen peroxide as a supplemental source of oxygen, but as this compound is so reactive, it is difficult, if not impossible to dose correctly during an emergency.

Emergency Procedure Safety

Aquarists are cautioned that some emergency protocols can create a risk to health and property. Remember that these situations often mix electricity, internal combustion engines and water - all during potential disaster conditions such as storms and floods. The best way to avoid problems is to fully understand the operation of every piece of safety equipment before you need to use them. Always follow the manufacturer's instructions and never use a device outside its operational parameters.

When to Initiate Emergency Procedures

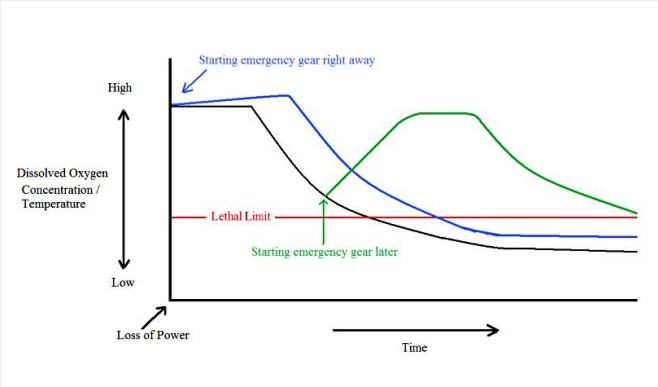
Its common practice for aquarists to start up an emergency life support system immediately after the emergency begins. The power goes out, and the natural reaction is to start up the battery back-up system or the generator right away. There are a few cases though where it is best to wait. For example, batteries have a finite amount of energy available to run the life support system. Once that reserve is exhausted, they stop. Think of an aquarium that is operating normally and has a dissolved oxygen saturation level of 8 ppm. The power goes out and the dissolved oxygen level hold steady for a time and then begins to drop. If you start the battery back-up right away, some of its energy will be wasted holding the dissolved oxygen at, or slightly above the saturation level. On the other hand, the animals can survive oxygen

concentrations down to some point below that of saturation. It you wait to start the battery back-up until the dissolved oxygen levels drop a bit, then more of its energy will go to maintaining an acceptable dissolved oxygen level. How long to wait is a matter of good estimating. Without a dissolved oxygen test kit, it may be a bit of a guess, although you can certainly observe the fish's respiration rates, and don't begin emergency aeration until a slight rise in their breathing rate is noted. Another application of this idea is when using ice or other finite water cooling method. Delaying the use of ice until needed will extend the length of time that the aquarium's water temperature is kept within a range that can be survived by the animals. The associated graph attempts to show this pictorially. Animal loss occurs when any of the lines crosses the red threshold. Notice that by initiating the emergency procedures only when absolutely necessary, the animals can be kept alive a bit longer.

When to Abandon Rescue Attempts

There are going to be some unfixable situations, where nothing you can do will help your animals. Examples include; the house holding the aquarium sustains structural damage, the power remains out too long or the floodwaters rise to the tank level. In these cases, it may be best to give up trying to maintain life support systems and determine if there is any way to move animals to a safer place. Paramount to all this is you must discontinue any attempts at emergency aid for your aquarium if there is any risk to human safety. An example of this would be staying with your aquarium during a wildfire, or not evacuating your home after damage from an earthquake. While this may seem like obvious common sense, in the heat of the moment people sometimes make poor decisions.

The reaction of the staff of the Aquarium of the Americas in the wake of hurricane Katrina is a good example of proper handling of aquariums after a massive natural disaster that could not prevent animal loss. According to published reports, the Aquarium of the Americas lost many of their 10,000 specimens when their emergency generators failed due to flooding. Aquarium staff that remained behind managed to save certain high value or air breathing animals by moving them out of the facility to safety. In most opinions, there was nothing else that could have been done in this case - emergency generators are typically designed to keep animals alive for the short term, not during months of rebuilding following a disaster of this magnitude.



Graph showing when to initiate emergency procedures.

The Aftermath: Added Insurance

When the emergency is over, regardless of the success you've had in saving the animals, there may be the additional step of contacting your insurance company to file a claim:

1. Always speak with your agent beforehand so that you know what is covered and what isn't (live animals are rarely covered, and you may need a special rider to cover water damage from an aquarium).

2. Prepare an inventory of your aquarium equipment, both as a list and in pictures or video. Receipts are also helpful. Needless to say, don't store these records in the same area where the inventoried items are!

3. Document the loss in the same manner, especially if you took steps to reduce the claim (making repairs to broken windows, renting a generator etc.)

4. Contact your insurance company as soon as possible following the loss.

Conclusion

Aquarists should have a written protocol for household members to use to take care of the aquarium in their absence. It does no good to build redundant systems, have power back-ups at the ready and then be out of town when an emergency arises.

Preparing for aquarium emergencies is a bit like listening to a sales pitch for life insurance; it is probably a good idea, but nobody really enjoys the process. While this article cannot solve every aquarium emergency, it hopefully gives some ideas that can be implemented with little cost which may pay big dividends in saving the lives of aquarium animals.

References

1. Hemdal, J.F. 2006. **Advanced Marine Aquarium Techniques.** 352pp. TFH publications, Neptune City, New Jersey

BREEDER'S NET

Rearing the Golden Damselfish, Amblyglyphidodon aureus, A Promising Candidate for Aquaculture

By Todd Gardner

Four separate spawns were collected, eggs were hatched, and larvae were reared with a success rate approaching 100%, using rotifers as a first food. These preliminary successes in rearing A. aureus suggest that members of this genus may be good candidates for commercial aquaculture.

Published April 2008, Advanced Aquarist's Online Magazine.

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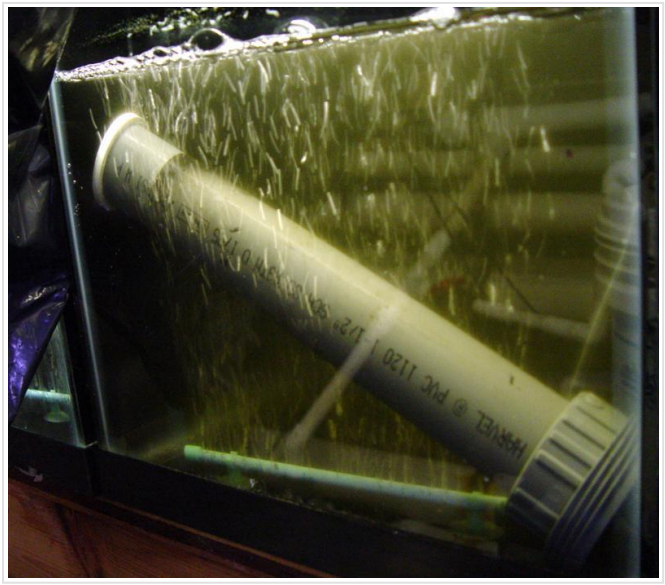
Keywords (AdvancedAquarist.com Search Enabled): Breeder's Net, Breeding, Todd Gardner, aquaculture, captive breeding, Damselfish
Link to original article: http://www.advancedaquarist.com/2008/4/breeder

Damselfishes (Pomacentridae) present a quandary for people involved in marine ornamental aquaculture. They are hardy, aggressive feeders that come in an impressive variety of brilliant colors and they are extremely popular in the marine aquarium hobby. However, despite the popularity of the entire family, only two genera of 28, *Amphiprion* and *Premnas*, have been cultured commercially. Attempts to rear species within other genera, including *Pomacentrus*, *Abudefduf*, *Chrysiptera* and *Dascyllus*, have met with little or no success to date. The reason for this is likely that their small size at hatching prevents them from accepting rotifers as a first food. I have been able to verify this hypothesis through my own experience while attempting to rear *Chrysiptera paracema*, *Dascyllus trimaculatus*, and *Pomacentrus leucostictus*. *Dascyllus albisella* and *D. aruanus* have been reared in the laboratory (Danilowicz and Brown, 1992), but not without the use of wild plankton. Although damselfishes account for almost half of the 20-24 million individual marine ornamental fishes traded annually (Wabnitz et al. 2003), their relatively low price fails to provide an economic incentive for aquaculturists and researchers to work toward overcoming the bottlenecks preventing their commercial production.

In the investigation described herein, eggs from a pair of *Amblyglyphidodon aureus* were collected from the living coral reef exhibit at Atlantis Marine World, a public aquarium in Riverhead, NY. Four separate spawns were collected, eggs were hatched, and larvae were reared with a success rate approaching 100%, using rotifers as a first food. These preliminary successes in rearing *A. aureus* suggest that members of this genus may be good candidates for commercial aquaculture.

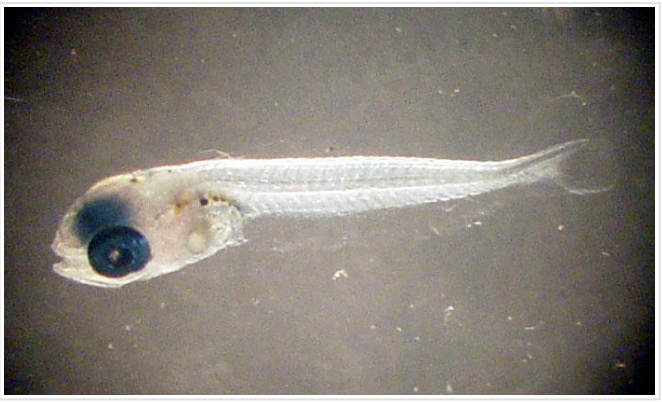
Methods

In May 2006, six *A. aureus* were received as a donation from a hobbyist and placed in the 20,000-gallon coral reef tank at Atlantis Marine World. This was our first experience with



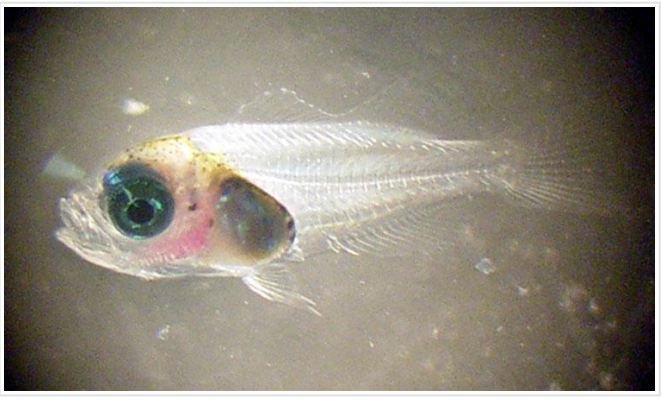
1 ½ inch PVC pipe with eggs from the first spawn. Eggs hatch in the evening under gentle aeration 5-6 days post spawn. Photo by Todd Gardner

damselfishes of this genus and our observations of their behavior in quarantine led to our decision to place them in the reef tank. Like *Chromis* spp. and in contrast to many other Pomacentrids, *Amblyglyphidodon* spp. are pelagic and gregarious, swimming out in the open in loose assemblages rather than aggressively defending a territory on the bottom. These characteristics make them much more suitable for a large community tank than many of their solitary relatives.

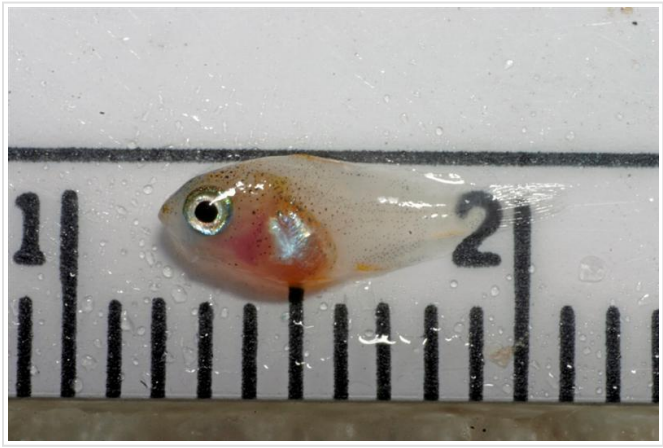


Larval A. aureus immediately after hatching. Photo by Todd Gardner

Larval A. aureus at day 12 post hatching. Note deepening body, differentiation of fins and the first appearance of pigment. Photo by Todd Gardner

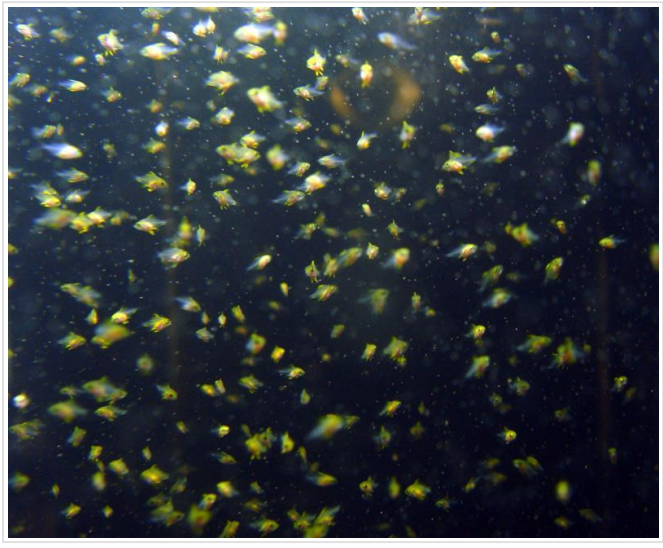


Larval A. aureus at day 15 post hatching. The fins are almost fully developed. Photo by Todd Gardner



In this 15-day-old larva, pigment cells can be seen over much of the body. Photo by Chris Paparo

By day 30, post hatching, A. aureus has taken on the characteristic damselfish body shape. Photo by Todd Gardner



A. aureus at day 32. For me, the greatest reward for all my tedious labor in aquaculture is the sight of a tank filled with newly metamorphosed post-larvae. Photo by Todd Gardner

In August 2006, while working on a piece of plumbing in the tank, an egg mass was discovered on a pipe near the surface. Observation later revealed one of the *A. aureus* defending it. We had no way of knowing how long the spawn had been there, but after two additional days, the eyes appeared to be well developed and we decided to remove the pipe so we could attempt to hatch the eggs.

The pipe was placed in a 29-gallon aquarium with natural seawater and the eggs were agitated with gentle aeration. Most of the eggs hatched on the second night after moving the pipe. Larvae were approximately 5mm upon hatching. Rotifers (*Brachionus rotundiformis*) were added and maintained at a density of 10/ml. Although the larvae were large and appeared to be eating rotifers immediately, my previous lack of success rearing other damselfish species prevented me from being overly confident and I decided to incorporate cultured copepods (*Acartia hudsonica*) into the daily feeding regime in addition to rotifers. The alga, *Isochrysis galbana* was maintained at an approximate density of $2x10^5$ cells/ml for the first 10 days, after which time the tank was connected to the system. The rearing system consists of seven 29-gallon aquaria, a bio-filter and 40-watt UV sterilizer. Beginning on day 11, HUFA-enriched *Artemia* was introduced to the larval diet and became the exclusive food after a 3-day overlap with rotifers and copepods. Dry foods were introduced at day 20, however *Artemia* remained the primary food through day 50.

At day 60, these golden damsels could be considered market-size. Perhaps they will add a splash of color to our 80,000-gallon snorkel tank this summer. Photo by Todd Gardner

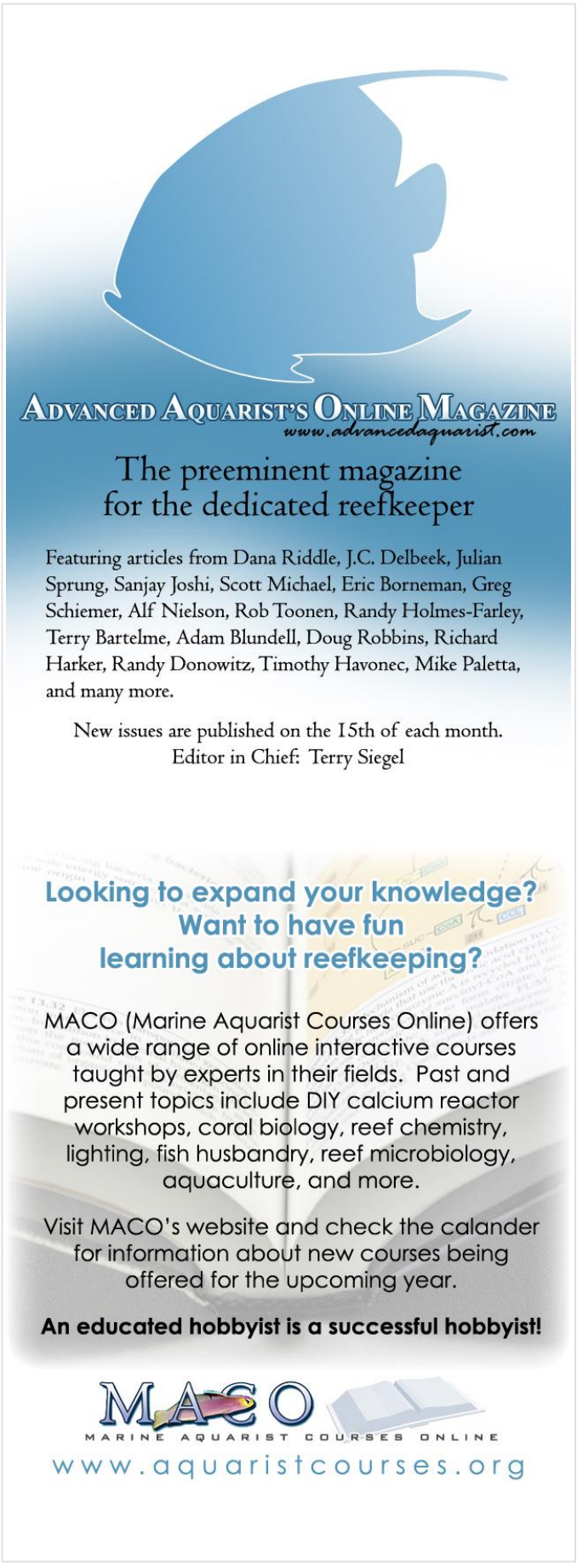
A golden damselfish watches over her nest on a gorgonian skeleton. Photo by Joe Yaiullo

Around day 15, the larvae began to change in shape and behavior. They became more compressed, laterally and the body became noticeably deeper. The caudal fin also became slightly forked and small melanophores (pigment cells) began to appear. Larvae began associating with the bottom or some structure in the tank such as airlines and plumbing. Another distinct metamorphosis occurred around day 30 when the body shape deepened further and a sudden, drastic increase in melanophores resulted in the fish taking on a bright yellow color, virtually overnight. No mortalities were observed during the larval stage except for the 5 individuals sacrificed, weekly for photographing and measuring. The average growth rate of larvae for the first 30 days was approximately 0.17mm/day.

Unfortunately, I must mention one negative habit of this mostly-reef-safe species. Although it is relatively peaceful for a Pomacentrid and does not have an appetite for desirable reef invertebrates, spawning pairs occasionally strip the tissue off part of an *Acropora* branch and use it as a nest site. This is not a problem in our 20,000-gallon reef tank, where an army of coral-eating fishes is no match for the growth of our scleractinians, however it's easy to understand how a hobbyist with a small reef tank might not tolerate this behavior. I never asked the donor, but I can't help but wonder if that has something to do with why we received the donation in the first place. The good news is, once a pair has decided on a nesting site, they usually stick with it. The pair that is responsible for the spawn shown in **photo #10** has been using this site for more than six months without further damage to the coral. They may even help to protect the coral colony on which they spawn by keeping algae off the exposed skeleton, eating parasites, and chasing away coral grazers.

Three subsequent spawns have been removed, hatched, and reared since the original trial, all without the use of copepods,

Their tendency to build nests on coral skeletons may make Amblyglyphidodon species a questionable choice for some reef keepers. Photo by Joe Yaiullo



and all with survivorship approaching 100%. The ease with which *A. aureus* has been reared in these preliminary trials suggests that it may be a suitable species for aquaculture. We shipped part of the first brood to our friend, Bill Addison, owner of C-quest marine ornamental fish farm in Puerto Rico, so hopefully, captive-bred golden damselfish will soon be available in your local fish store.

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REEFKEEPING EVENTS

What's Happening in Your Area?

By Advanced Aquarist Readers

Check to see if an event is happening in your area!

Published April 2008, Advanced Aquarist's Online Magazine.

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Keywords (AdvancedAquarist.com Search Enabled): Advanced Aquarist Readers, Reefkeeping Events
Link to original article: http://www.advancedaquarist.com/2008/4/events

Do you have an upcoming event?

If so, please email us at feedback@advancedaquarist.com and let us know about it!

Second Annual Tidewater Area Marine Aquarium Symposium, April 26

Date: April 26, 2008
Time: 1:00 PM
Location: Virginia Aquarium and Marine Science Center, 717 General Booth Blvd., Virginia Beach, VA. 23451
Website: http://www.tidewater-reefers.org

The topics this year will be: Marine Aquarium Chemistry and Reef Nutrition

The two speakers for this event will be Chris Jury and Randy Reed. Chris will be speaking on Marine Aquarium Chemistry and Randy will be speaking on Reef Nutrition.

This event will once again be at no cost to TRS members in good standing. The cost to non-members will be $7.00 for advance ticket sales and $10.00 at the door. The Virginia Aquarium and Marine Science Center auditorium has limited seating and advance purchase of tickets is strongly encouraged for non-members wishing to ensure they get a seat. Those that purchase advance tickets and later decide to become members of TRS (and we hope you will) may have their membership dues reduced by the amount paid for their ticket. This offer will extend up to the day of the event.

Seating is limited and all TRS members will get priority seating and free tickets. Advance tickets can be purchased by arrangement with a TRS officer and may soon be available for online purchase like last year. Non-member tickets will be sold first come, first serve. Feel free to email president@tidewater-reefers.org to make arrangements for advance ticket purchases.

Manhattan Reefs 2008 Spring Frag Swap, April 27

Date: Sunday, April 27th, 2008
Time: 10:00 AM - 6:00 PM
Location: Pratt Institute, Brooklyn, New York

Cost: RSVP - 1 Member - $20 (Pratt Institute Students admitted free with Photo ID)

Guest speakers:

- Jake Adams: Carribean Corals
- Richard Ross: "Welcome Ceph Overlords"

There will be three Pratt Aquarium tours throughout the day. The fragging demonstration will be presented by Tristan Wilson.

And as usual, admission includes:

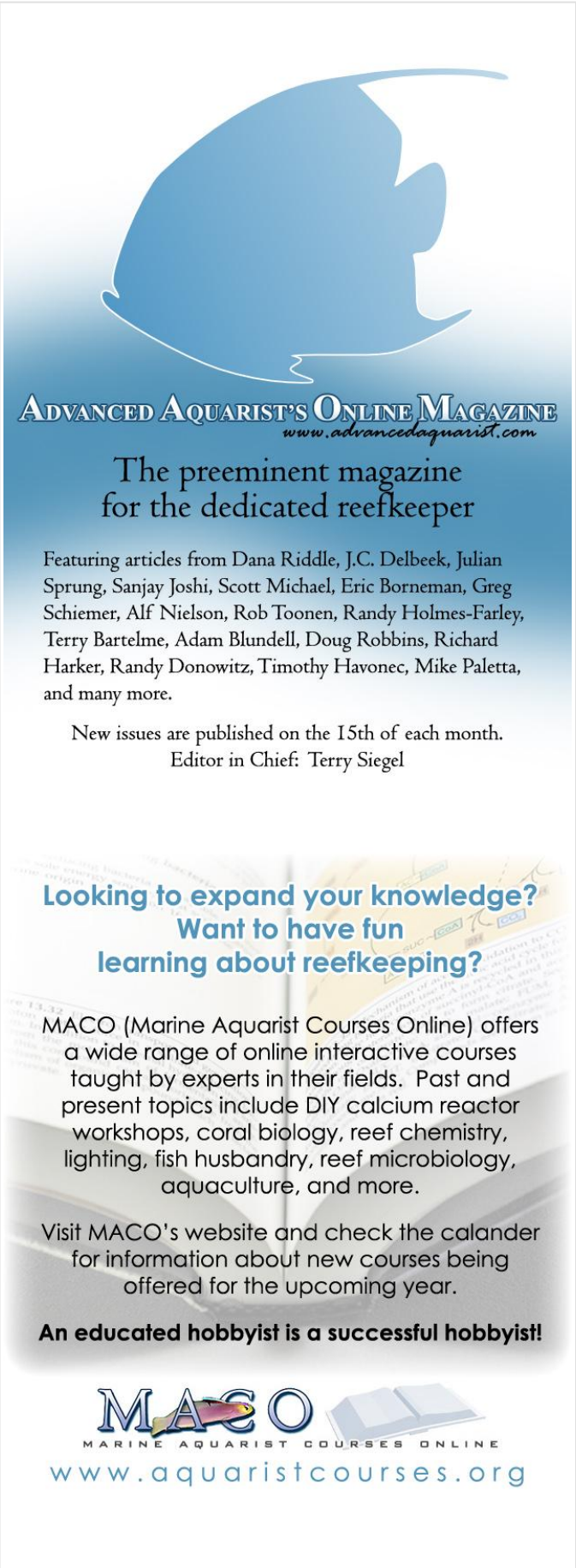
- Manhattan Reefs Frag Auction
- Free Raffle Tickets
- Reef Pest Inspection Station
- Equipment manufacturers
- Livestock vendors
- Several group buys
- Food, snacks, soft drinks
- Baggies, rubber bands, warmed saltwater

Vendor Tables are still available. If you are interested, please send an email to admin@manhattanreefs.com.

Midwest Frag Fest, May 3-4

Date: May 3-4, 2008
Time: Saturday (9 AM - 5 PM), Banquette @ 6 PM; Sunday (9 AM - 2 PM), raffle 3 PM
Location: Clock Tower Resort and Conference Center, 7801 E State Street, Rockford, IL 61108-2721, US
Website: http://midwestfragfest.com/index.html

Midwest Frag Fest is the premier coral conference across the midwest. Frag Fest 2008 will be held on May 3rd and 4th at the Clock Tower Resort and Conference Center located just off of I-90 in Rockford IL. Our goal is not only to provide both hobbyists and vendors across the region with the best experience at an



event of this type, but to donate a portion of the proceeds towards reef conservation and also give back to the community. Admission will be discounted with the donation of canned goods for a local food pantry.

Attendee information:

- Hotel accommodations are available at a reduced rate at the Clock Tower Resort for only $94 per night.
- Full event pass includes admission to all speakers, trade show and frag area, banquet dinner, and event T-shirt . The cost is $55. Sign up fast. First 40 to register will sit at a speakers table at the banquet. What a wonderful opportunity to chat with the pros
- One day pass with all access for that days events are available as follows:
  - Saturday with dinner $45
  - Saturday with out dinner $20
  - Sunday $20
  - Trade show, fragging area only $10
  - All at the door admissions reduced by $1 per can good donated up to $5 off

Speakers include Adam Blundell, Rod Buehler, James Fatherree, Mike Paletta, Gary Parr, Steven Pro, and Randy Reed.

International Marine Aquarium Conference '08, May 30-June 1

Just Imagine...a weekend where you can see live presentations by the most widely known, well-respected authors and lecturers in the marine aquarium hobby.

At the International Marine Aquarium Conference the speakers will be covering all the latest information and research on marine aquarium fish, corals and invertebrates. Meet with them socially, see exhibits by some of the foremost manufacturers and dealers in the aquarium hobby, and get some great deals on conference specials.

IMAC is open to ALL hobbyists . You do not have to belong to a marine aquarium society or even own a reef tank to attend, just be interested in learning more about this fascinating hobby. IMAC is a non-profit venture by hobbyists for hobbyists to insure the continuation of an annual educational event for aquarists, at a reasonable cost.

Whether you are a seasoned aquarist or just a beginner, IMAC is something you need to take in. And IMAC is put on each year by the same people, so if you attended IMAC in 2003, 2004, 2005, 2006 or 2007 you know the high quality of the show that we will put on.

IMAC 2008 will take place in Chicago, Illinois, USA - May 30, 31 and June 1 at the Crowne Plaza Hotel, Chicago IL:

Crowne Plaza Hotel, Chicago O'Hare
5440 North River Road
Rosemont, IL 60018, USA

For more information, visit http://theimac.org/ or contact Dennis Gallagher.

Reefkeepers Weekender, August 29 - September 1

Date: Friday, August 29 through Monday, September 1, 2008
Location: Pontins, Pakefield, Suffolk (2 hours from London, 3 Hours from Birmingham)

The Reefkeepers Weekender has grown steadily since it's inception, and last year was a really fantastic weekend, with superb presentations, a Quiz, brilliant raffle prizes, cabarets, plenty for the kids, and LOTS of late night chat (and a fair bit of Resolve sold in the shop!).

The highlight of the weekend will be, in additon to the usual raffle and quiz, presentations by none other than world renowned experts:

- Mr Anthony Calfo, Author of two of the "Bibles" of reef keeping, "The Book of Coral Propagation" and "Reef Invertebrates" amongst others. Anthony has also recently had articles in "Ultra Marine" magazine.
- Top Dutch expert, Mr. Ron Hessing. Ron writes for Koralle magazine in Germany, A Journal in the USA, and his own site www.marineaquarium.nl and has spoken publically at events around the world, most famously, MACNA and the Boston Reefers Society.

As well as these eminent experts, there will be other presentations, to be confirmed. Details of what their presentations will be will follow a bit nearer the time.

It is essential that you book now if you want to come this year. Last year, the holday park was full, and some of those that wanted to come were disappointed. So, don't delay your decision this time people. It is bound to be over subscribed with a line up like this, so get in there and secure your place. You need to contact Pontins, Pakefield to book on 01502 502 900. Tell them it is for the Reefkeepers Weekender, and make sure you give them your UR name as well your real one, so that we can issue badges.

For 3 nights Fri, Sat and Sun, it is £60 and half price for Under 18's. This is half board, so a full Breakfast and Evening Meal each day are included. There will be Trade Stands and Give-aways too, and, of course, a chance to meet up for our annual chin wag and party! You do need to book this now! It has become one of the leading UK meets of the year and you don't want to miss it!

MACNA XX, September 5-7

Presented by Atlanta Reef Club and MASNA, MACNA is the largest hobbyist marine conference in North America. New aquarium products, vendors will often wait until MACNA to release new products into the hobby. Hobby professionals, you will have a chance to meet and mingle with professionals in the hobby like Eric Borneman and Anthony Calfo. A chance to be at a conference with hundreds of other people just as obsessed with aquariums as you are.

We have selected the Westin Peachtree Plaza as the host hotel for this event. It is the tallest hotel in the western hemisphere. Our negotiated room rate is $119.00 per night with discounted parking. Everyone that stays in the hotel will be given free internet access from their rooms.

This 73-story tower, topped by the revolving Sun Dial Restaurant, Bar & View, graces the heart of Atlanta. Connected to AmericasMart, The Westin Peachtree Plaza, is steps from CNN, Georgia Aquarium, Georgia World Congress Center and the Georgia Dome.

Contact Information:

MACNA XX
1266 West Paces Ferry Rd.
Suite 194
Atlanta, GA 30327
PHONE:
FAX: 860.540.2351
E-mail: info@macnaxx.com
Contact Form

AQUARIUM FISH

CONSPICILLATUS ANGEL

By Pavaphon Supanantananont

This is not the an easy member of the genus because they are sensitive. Because of it price and rarity, make sure that the fish started to feed before you get it.

Published April 2008, Advanced Aquarist's Online Magazine.
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Keywords (AdvancedAquarist.com Search Enabled): Angelfish, Aquarium Fish, Fish, Pavaphon Supanantananont
Link to original article: http://www.advancedaquarist.com/2008/4/fish

I think that every aquarist would like to have a fish of their dreams, the one that they just want to see once in a lifetime. For me, I also have one too! And that is the fish that I would like to discuss here. It is the Holy Grail for all Angelfish lovers, the Conspicuous Angelfish (*Chaetodontoplus conspicillatus*)

Conspicillatus Angel belongs to the family Pomacanthidae like all other angelfishes. It is one of the rare members of the genus *Chaetodontoplus*, which makes it infrequently seen or available to aquarists. It is a sought after around the world due to its spectacular markings and rarity. The fish has a gray body on the upper part which turns a darker color until it becomes black on the lower part. In some individuals, the different between these two colors may become less obvious. The easiest way to distinguish this species is to look at a bright blue ring-like line surrounding the eyes on the yellow face, which makes it as obvious and attractive as it name: conspicuous.

Like other members of the family, the juvenile of the conspicuous has another color pattern that doesn't look exactly the same as the adult. The juvenile of this species looks similar to the adult but lacks the blue line around the eye and yellow patch on the middle of the pectoral fin. Also, the ventral fin is black instead of white and there's some color missing on the other parts of the body.

This 'angelfish is found south of the great barrier reef toward the islands of the South Pacific like New Caledonia and Lord Howe. In Lord Howe, the fish have been observed in lagoons and at a lesser depths. But Lord Howe is a protected area so that all wildlife cannot be taken out of the wild. Normally, this fish will be found near coral reefs and lagoons or the protected area near harbors at depth between 2-60 meters. Adults will be found at a greater depth, while the juvenile is more common in shallow water. This is a large angelfish species that can grow up to about 10 inches in length.

There was a report of a hybrid between the Conspicuous (*C. conspillatus*) with the Meredith's Angelfish (*C. meredithi*) in the wild. On rare occasions, this hybrid will be caught and sent to Japan where it commands a high price tag. Several pictures of this cross-breeding have been taken and published in many Japanese fish magazines and books.

The first time that I had a chance to see this fish was when I spend my holiday in Hong Kong, at a fish market. The one that I saw was about 10 inches. At first I saw the fish swimming in the main show tank. I was very excited to walk around the tank to get a better look at it. This full grown *Conspicillatus* angel is housed with many 'big size' angels such as Halfmoon Angelfish (*Pomacanthus maculosus*), French Angelfish (*P. paru*), Emperor Angelfish (*P. imperator*), Blue-ring Angelfish (*P. annularis*), King Angelfish (*Holacanthus passer*) and many more. The fish seems to be healthy in appearance, but a crowed tank like this may cause stress in the fish and its health in the long term. After watching for awhile, I asked the owner for permission to take a photo. He was kind enough to let me do so. He told me that the fish was not for sale, and that it was with him for awhile and was eating well.

The Conspicuous Angel is considered a very rare fish from the Thailand fish trade. It has been shipped from Hong Kong on a few occasions long ago and never appeared again. However, this fish is occasionally offered for sale in the U.S. and Japan. My elder friend, Archen Supasri, who is a rare fish collector, suddenly was able to get one for his tank right after he saw it. The fish that Archen got was about 5 inches. I told him that it might be too big and be too finicky to get to start eating. The one that we selected was the smallest one in this shipment and it was in great condition with no sign of disease. It was amazing to see the reaction of people when it appeared at the front of the holding tank. On that day, I decided to follow Archen to his house when he introduced the fish to his tank.

Archen's tank is 7-ft reef tank that housed mainly *Pseudanthias spp*. together with several wrasses and some angelfish like the Japanese Pygmy Angelfish (*Centropyge interruptus*), Joculator Angelfish (*C. joculator*), Flame Angelfish (*C. loriculus*) and a Goldflake Angelfish (*Apolemichthys xanthopunctatus*). When first introduced, the conspicuous quickly swam into a rock crevice for protection. We were happy to see that it was not getting bullied by other angelfish which we were concerned about; maybe because it was larger than any of the other angelfish in the tank.

For the first three days, the fish seems not to show any interest in food. It swam peacefully around the tank, but would dash to the crevice when someone approached. The active school of smaller *Pseudanthias* made a perfect type of fish for it to feel more comfortable. It became one of our topics every time when we talked on telephone for almost a week. However, on the fifth day, it started to show interest in dry clam and the pellets which was floating in front of it. Archen cried out loud with happiness on the phone while he was having the conversation with me after he saw it eat pellets for the first time.

After that we both were busy and did not communicate with each other for about two weeks. Then one early morning, I received a phone call telling me with great joy that the Conspicuous Angel became tame and he could feed it from his hand. I was glad to hear the news and immediately rushed to his house.

On weekends, I usually went to visit him to look at the fish. His tank is gorgeous and wonderful for me as it always is. Archen kept mainly soft corals such as *Sinularia*, *Sacrophyton*, and *Lobophyton spp*., along with some *Acropora* and *Turbustrea spp*. He was lucky that his *Conspicillatus* did not attack any corals and clams. By the way, many people have reported that this is not a totally reef safe angelfish, especially with zoanthids and brain corals. And some would even nip at the polyps of *Acroporas* or some LPS.

By now, the fish has been kept for about two years. The only problem that we have encountered was cloudy eyes, which was the result of poor water quality mainly from a nitrate problem. But its eyes turned back to normal after water changes. This symptom could be preventing by maintaining better water quality. But for others, the main problem is how to get the fish to eat. At the beginning, the *Conspicillatus* is considered a difficult fish to start eating. But once it starts to eat, it will gradually accept a

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Contact our Chief Editor, Terry Siegel, at terry@advancedaquarist.com and get started!

wide variety of food, from vegetable to meat. It can be feed with pellets and flake or chopped seafood and also ghost shrimp; make sure that it also gets green stuff such as cabbage or Nori as a supplement. Even when it starts eating, many suddenly stop eating. We don't know the exact reason, but switching food once it gets started might help when it stops eating the food we normally offer.

Larger specimens usually refuse to eat and gradually vanish in a home aquarium. The best size to get them eating is the small juvenile around 3-5 inches. If you are lucky enough to acquire one that starts to eat, do not disturb it and let it fully acclimate to the tank so that it doesn't get stressed and stops eating. Newly introduced fish are prone to Ich and fin rot, but it will get better in a tank with good water quality.

These fish will do well in a big tank with plenty of crevices for them to hide when threatened. Good water quality is required like for other members of the genus Chaetodontoplus. This is not the an easy member of the genus because they are sensitive. Because of it price and rarity, make sure that the fish started to feed before you get it.

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LATERAL LINES

Water Flow Part II: Common Devices

By Adam Blundell M.S.

This is a review of some of the more common water flow devices used in the hobby.

Published April 2008, Advanced Aquarist's Online Magazine.

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Keywords (AdvancedAquarist.com Search Enabled): Adam Blundell M.S., Flow, Lateral Lines, Water Circulation
Link to original article: http://www.advancedaquarist.com/2008/4/lines

Last month I discussed the differing types of water flow. The idea there was to get people thinking about what type of flow they want in their aquarium. This month I'm going to present some very basic information. This is a review of some of the more common water flow devices used in the hobby.

Powerheads

Powerheads are submersible water pumps. They have an intake and an output. These have been a staple in the hobby for two decades. There are several manufactures but nearly all powerheads look and work the same. They have a housing with two openings (water to come in and water to go out) and they have a spinning impeller. This impeller is a rotating wheel with many blades, and is driven by a magnet. The magnet spins on a ceramic rod spinning the impeller to push out water.

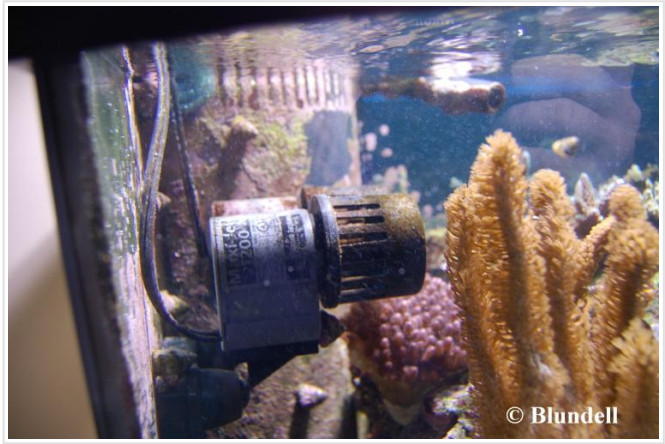
Stream Pumps

After many, many years of the same old thing with powerheads a revolutionary idea came through. Instead of an intake and an output the new series of pumps has a very broad output and the water is drawn in from all sides (a ring pattern around the pump) and the flow produced is a wide almost laminar pattern. I describe this is a cylinder of water moving along with the pump in the middle drawing from behind and pushing forward.

Shown here a standard powerhead. Water is drawn through the opening in the bottom and pushed out the side outlet.

Once this type of engineering came into the hobby it spread like wild-fire. The total amount of water pushed around is vastly greater than typical powerheads and the electrical usage is not increased. These pumps are far superior in terms of efficiency.

Two main types of stream pumps are now available. One is a conversion from a standard powerhead where a modification kit is used to replace part of the powerhead. The second is a manufactured stream pump which is designed with a propeller types of blade and not the standard impeller.

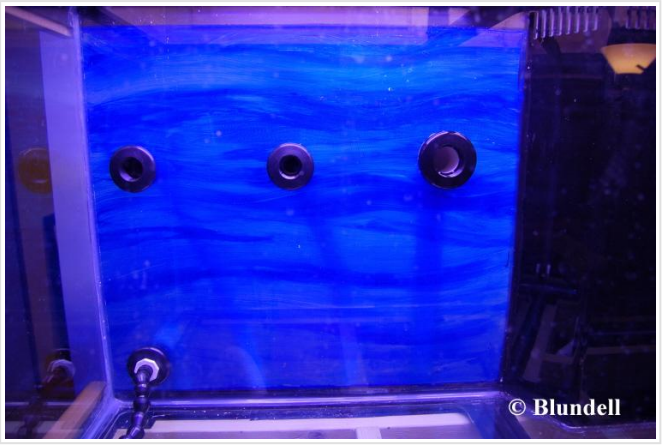


These two pumps may look very similar. One is a stream pump, and the other is a powerhead with a modified casing to create a stream pump.

External Pumps

I just like that term because I'm not sure how else to say it. These pumps are not submersible and must be kept out of the water. For these pumps to work they need plumbing. That is they have a pipe that takes water into their intake and another pipe that takes the water out of their output. These pumps can push a lot of water. On average they produce 10 times the water flow and with a considerable amount of head pressure. These pumps are often used as tank return pumps to push water against gravity back up to the display tank.

In recent years the "closed loop" system as become very popular. It should be noted in my opinion the closed loop is about to face extinction. I think a few years from now we'll all be looking back on the days' of the closed loop. The idea here is that the water from the display tank runs down a pipe to the pump, then back up another pipe and into the tank. Because gravity is pulling the water down to the pump, it offsets the force needed to pump the water back up to the tank. It produces almost 0 head loss and the pump can operate at nearly full force. There is more to it than that, but I don't see reason to cover it. Feel free to email me for more details.



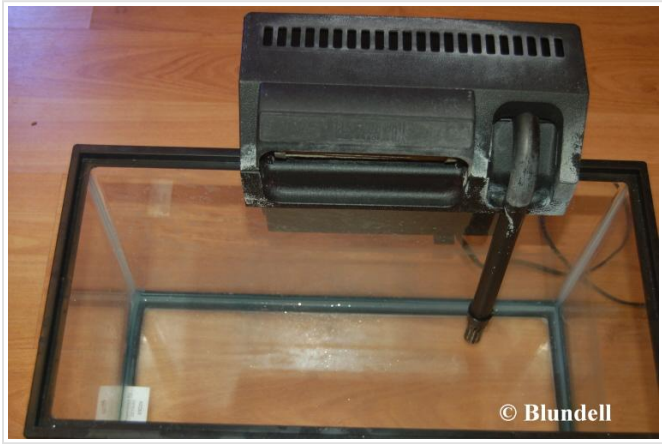
Aquarium Enthusiast "Sukie" shows off her closed loop return system. This system uses four bulkheads where water will re-enter the aquarium. Looking below the aquarium you can see where the water will come out of an external pump, split into four pipes, and go through those pipes back to the tank.

Hang On Filters

These filters are super popular in the freshwater hobby. However, they are rarely seen in the marine hobby. That may be changing as more and more hobbyists venture into the world of nano tanks. These items are great for producing water flow (especially along the surface) for small aquaria.

Water Direction Changing Devices

There are four different water direction-changing devices that I frequently see. They are a spinning outlet of some type (usually put on a powerhead), a gear driven item that changes the direction of the water, a valve that opens and closes different outlets, and a powered swiveling outlet. The common manufacture/brands of these items are shown here.



Hang on filters are incredibly popular in the freshwater hobby. For some reason they haven't made a big impact in the saltwater hobby, but that is quickly changing as they are being used more and more in very successful small reef tanks.

Shown here are a SCWD which uses gears to push water left, then right, then left, then right and so forth. The water moving through the unit pushes the gears.

Conclusion

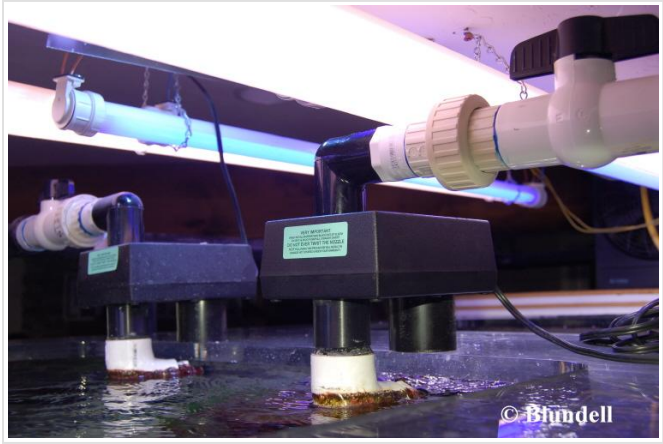
While many devices exist for water flow, there are some new revolutionary products on the market and on the horizon. Upcoming articles will introduce these items to the readers. Before exploring these items it is a good idea to learn the basics... and hopefully we just covered that.

The Ocean Motion shown here is being used to divert the return water from an external pump to alternating outlets.

The actuated ball valve (Hayward Valve) electronically turns a ball valve to direct water in different directions.

Author Information

Adam Blundell M.S. works in Marine Ecology, and in Pathology for the University of Utah. He is also Director of The Aquatic & Terrestrial Research Team, a group which utilizes research projects to bring together hobbyists and scientists. His vision is to see this type of collaboration lead to further advancements in aquarium husbandry. While not in the lab Adam provides services for of one of the Nation's largest hobbyist clubs, the Wasatch Marine Aquarium Society (www.utahreefs.com). Adam has earned a BS in Marine Biology and an MS in the Natural Resource and Health fields. Adam can be contacted at adamblundell@hotmail.com.



A SeaSwirl is a very common item. This device rotates back and forth at about a 90 degree angle spraying water in a sweeping motion.

This powerhead has a rotating device on the end which continually spins at a slow speed directing water around in a circle.

MEDIA REVIEW

Coral ID: "An Electronic Key to the Zooxanthellate Scleractinian Corals of the World" and "Corals of the World"

By Dana Riddle

Dana reviews John Veron's books and CD.

Published April 2008, Advanced Aquarist's Online Magazine.

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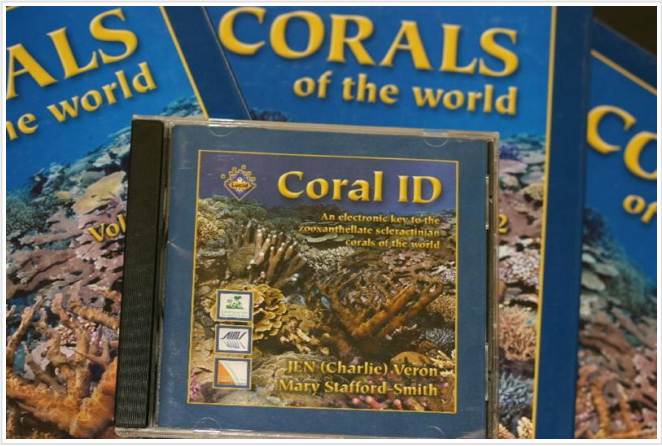
Keywords (AdvancedAquarist.com Search Enabled): Book, CD, Coral, Dana Riddle, Media Review
Link to original article: http://www.advancedaquarist.com/2008/4/review

Serious reefkeepers will instantly recognize the name of John Veron. He is generally regarded as the world's leading authority on scleractinian corals, and his work has been presented not only in a number of monographs and research articles but in his 1986 *Corals of the Indo-Pacific and Australia*. When this book was released, many serious aquarists acquired it, and few ever dreamed that this classic could be surpassed. But it has been - by John Veron himself, in his 3-volume set *Corals of the World* (with Mary Stafford-Smith as the science editor). As the title implies, corals from the Atlantic and Pacific Oceans are included in these volumes, as well as many newly-described coral species.

Although *Corals of the World* was published in 2000 and *Coral ID: An Electronic Key to the Zooxanthellate Scleractinian Corals of the World* was released in 2002, I suspect quite a few aquarists have entered the hobby in the meantime and might not be aware these valuable volumes. There are many hobbyists who have since advanced to the stage where they can appreciate these works, as well.

If you don't have one or both of these works, you should. Here's why.



Corals of the World

These magnificent volumes contain a wealth of information, with over 2,500 photos and 800 distribution maps (at the family, genus and species level). Eighteen coral families are here (divided into 66 genera and then hundreds of species). Almost all species have either close-up photographs of the each coral's 'skeleton', or (even better) technical pencil drawings that show the corallum structure as few photos ever could. There is also a short section on non-scleractinian corals (including genera such as *Millepora*, *Tubipora* and others).

Almost all photographs are 'fresh' and are not repeats from *Corals of Australia and the Indo-Pacific.*

Volume One

Aside from the obligatory Acknowledgements and Introduction, this volume includes an overview of types of coral reefs and discusses the important concept of zonation. This is followed by a chapter on geological history (where you'll learn of 7 mass extinctions of coral reefs over the millennia). Eleven pages are devoted to coral structure which is important for coral identification. The excellent pencil drawings by Geoff Kelley are exceptional scientific renderings. There is a short section on corals in captivity, where Dr. Veron recognizes the importance aquaria can play in public outreach and education, their value as research tools and, lastly, as a way for developing island nations to protect and manage this sustainable resource while creating modest income.

Volume One then gets down to brass tacks and examines Family Acroporidae, which includes genera *Acropora*, *Astreopora* and *Montipora*. There are a number of newly described species in the 268 discussed. Species are organized by 'groups' (38 for *Acropora*; 4 for *Astreopora* and 12 *Montipora* groupings).

Volume Two

Volume Two in continues in the vein of its predecessor and examines 12 families (56 genera), including:

Family Astrocoeniidae

- *Stylocoenella*
- *Stephanocoenia*
- *Palauastrea*
- *Madracis*

Family Pocilloporidae (including newly described species)

- *Pocillopora*
- *Seriatopora*
- *Stylophora*

Family Euphyllidae

- *Euphyllia*
- *Catalaphyllia*
- *Nemenzophyllia*
- *Plerogyra*
- *Physogyra*

Family Oculinidae

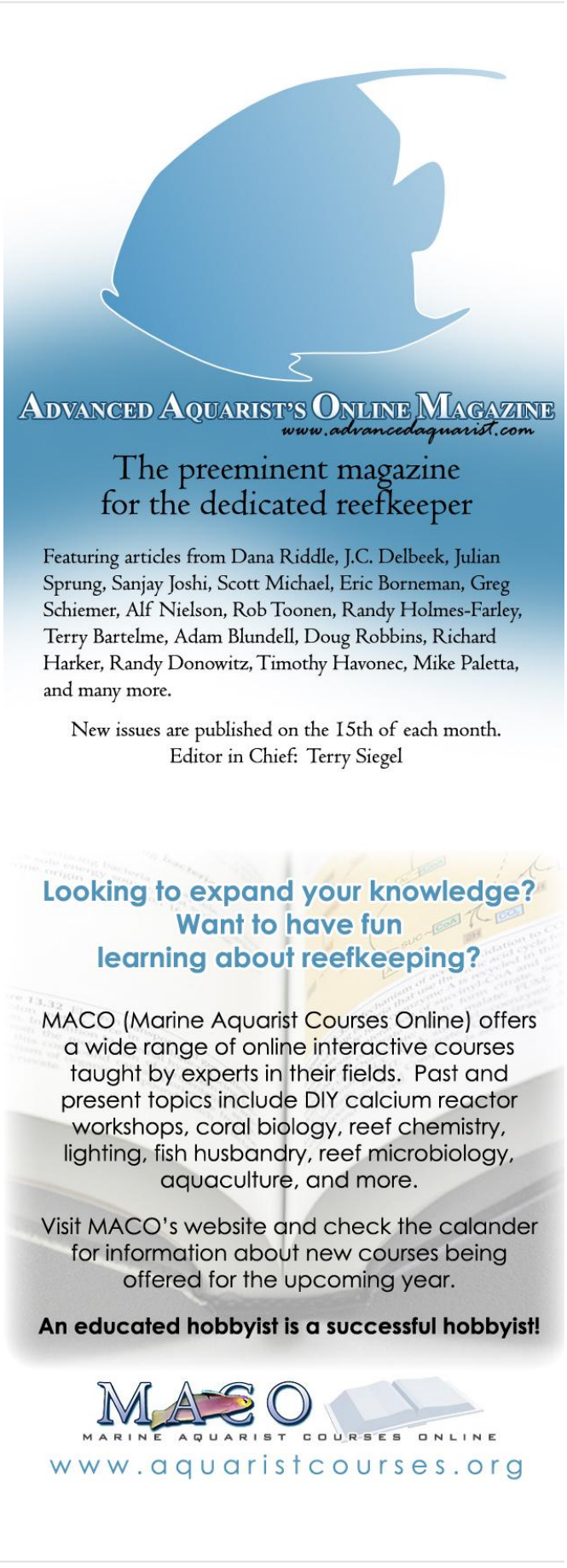
- *Oculina*
- *Simplastrea*
- *Schizoculina*
- *Galaxea*

Family Meandrinidae

- *Meandrina*
- *Ctenella*
- *Dichocoenia*
- *Dendrogyra*
- *Gyrosmilia*
- *Montigyra*
- *Eusmilia*

Family Siderastreidae

- *Pseudosiderastrea*
- *Horastrea*
- *Anomastraea*



- *Siderastrea*
- *Psammocora*
- *Coscinarea*

Family Agariciidae

- *Agaricia* (3 groups)
- *Pavona* (2 groups)
- *Leptoseris*
- *Coeloseris*
- *Pachyseris*

Family Fungiidae

- *Cycloseris*
- *Diaseris*
- *Cantharellus*
- *Heliofungia*
- *Fungia* (4 groups)
- *Ctenactis*
- *Herpolitha*
- *Polyphyllia*
- *Sandalolitha*
- *Halomitra*
- *Zoopilus*
- *Lithophyllon*
- *Podabacia*

Family Rhizangiidae

- *Astrangia*

Family Pectiniidae

- *Echinophyllia*
- *Echinomorpha*
- *Oxypora*
- *Mycedium*
- *Pectinia*

Family Merulinidae

- *Hydnophora*
- *Paraclavarina*
- *Merulina*
- *Boninastrea*
- *Scapophyllia*

Family Dendrophyllidae

- *Turbinaria*
- *Duncanopsammia*
- *Balanophyllia*
- *Heteropsammia*

Family Caryophylliidae

- *Heterocyathus*

Volume Three

The third volume of this set concludes the work with a look at 4 coral families, plus a highly illustrated synopsis of coral biogeography (including a fascinating look at reproduction), evolution, and a chapter entitled '*What are Species*' (which examines plasticity of coral growth forms in response to environmental and geographical influences). This volume concludes with an important key to coral identification as well as a listing of common coral names. These corals species are examined in detail:

Family Mussidae

- *Blastomussa*
- *Micromussa*
- *Acanthastrea* (2 groups)
- *Mussismilia*
- *Isophyllia*
- *Lobophyllia*
- *Symphyllia*
- *Mussa*
- *Scolymia*
- *Mycetophyllia*
- *Australomussa*
- *Indophyllia*
- *Cynarina*

Family Faviidae

- *Cladocora*

- *Caulastrea*
- *Erythrastrea*
- *Manicina*
- *Favia*
- *Barabottia*
- *Favites* (4 groups)
- *Goniastrea* (3 groups)
- *Platygyra* (2 groups)
- *Australogyra*
- *Oulophyllia*
- *Leptoria*
- *Diploria*
- *Colpophyllia*
- *Montastrea (3 groups)*
- *Plesiastrea*
- *Oulastrea*
- *Diploastrea*
- *Leptastrea*
- *Parasimplastrea*
- *Cyphastrea*
- *Solenastrea*
- *Echinopora*
- *Moseleya*

Family Trachyphylliidae

- *Trachyphyllia*

Family Poritidae

- *Porites* (6 groups)
- *Stylaraea*
- *Poritipora*
- *Goniopora* (5 groups)
- *Alveopora*

Non-scleractinian Corals

- *Millepora*
- *Tubipora* and others

Astute hobbyists will have noted that much of this book - coral species, photographs and distribution maps - is available on the internet. See, for instance:

http://www2.aims.gov.au/coralresearch/html/301-400/Species%20pages/342.htm

It should be noted that the internet version does not include all photographs. Those that are included are of reduced size and even when enlarged (and especially when printed) do not reflect the book's quality. Even with the best print quality, the wonderful skeletal drawings are just a little 'fuzzy' when compared to those in the book. Also, there are problems with the scale bars on the internet site (the scale bars in the book are of the correct size).

Coral ID: An Electronic Key to the Zooxanthellate Scleractinian Corals of the World

This ambitious endeavor has all corals listed in *Corals of the World*. While chapters are omitted about types of reefs, biogeography, etc., this compact disc contains keys to coral identification, which makes a difficult job relatively easy. The format is well thought-out, and it literally walks the user through the process. While its use can be made easier by understanding the terminology involved in coral ID, it is not mandatory as the keys have line drawings to use as a reference. Don't know what flabello-meandroid means? Not a problem, all one has to do is match the coral to line drawings (see this month's feature article entitled 'Coral Identification Primer for Aquarists').

The CD includes 794 taxa, and with patience, almost any stony coral can be identified through answering up to 45 questions. The identification process is not always lengthy and some corals can be identified after answering just a few questions.

In Closing

Only occasionally does a book transcend the distinctions of multiple disciplines and interests. *Corals of the World* manages to excel as a coffee table book with its amazing photography, yet, for those willing to delve deeper, it becomes a useful resource for the casual snorkeler or experienced diver, an indispensable tool for researchers and taxonomists, plus an inspiration for reef aquaria hobbyists. And it does so at a price that makes it a true value.

I have only one constructive criticism of *Corals of the World.* The undying myth that zooxanthellae are responsible for brilliant coral coloration is continued in this book. In all fairness, we know much more about the subject today than was known when these books were in preparation and now realize certain proteins within coral tissues are responsible for many of corals' brilliant colors.

Coral ID: An Electronic Key to the Zooxanthellate Scleractinian Corals of the World is a worthwhile addition to the library of any serious hobbyist. It offers powerful resources for the coral student and is an excellent research tool for anyone interested in underwater worlds.

Here's a bit of a surprise. I, along with a small group of hobbyists, had the pleasure of having dinner with Dr. Veron at one of San Francisco's sideway cafés a number of years ago. It was a beautiful evening and the food (as would be expected) was excellent, but Dr. Veron regaling us with his stories made for a memorable evening. Of course, there were tales of students trying to trick him by presenting a Caribbean coral skeleton that they claimed was found on the Great Barrier Reef, or his daughter's fascination with the underwater world. But we were astonished to hear that corals are not his true passion (astronomy, and especially stargazing in the outback, is his hobby). One would never know this judging by the superb quality of his works on stony corals. They are unsurpassed and deserve to be on the bookshelf of every reef hobbyist.

How to Order

There are a couple of ways to get these books. The set can be directly ordered from the Australian Institute of Marine Science (www.aims.gov.au/pages/bookshop.html) - shipping of the books from Australian is expensive and slow (unless you opt to pay a premium for expedited shipping). Of course, the standard internet booksellers have the books, but check with one of Advanced Aquarist's advertisers - Marine Depot (www.marinedepot.com) - they have an outstanding price on this 3-volume set. Other online retailers might offer it as well.

To my knowledge the Coral ID CD is available only through the AIMS bookshop. It has been my experience in dealing with AIMS that their shipping is quick, and delivery times are of modest duration. Postage (at least for smaller books and CDs) is reasonable.

ONLINE NEWS

Reefs in the News

From Online News Sources

Media coverage of the state of our world's reefs, interesting information, and other marine-related news.

Published April 2008, Advanced Aquarist's Online Magazine.
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Link to original article: http://www.advancedaquarist.com/marinenews

Despite report, whale watches say they heed speed rules (The Daily News of Newburyport)

National Marine Sanctuary in the News
April 30, 2008 05:08 AM

Eastman's Docks operates several whale watches out of Seabrook, as well as evening cruises and fishing excursions throughout the spring and summer. The company has five boats. The owners say they are in the business of whale watching for a reason and respect the species at all times.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/%22National+Marine+Sanctuary%22/SIG=124bl95ev/*http%3A//www.newburyportnews.com/punews/local_story_120205057.html

Portal Opens to Northern California's Three Marine Sanctuaries (Environment News Service)

National Marine Sanctuary in the News
April 29, 2008 06:14 PM

SAN FRANCISCO, California , April 29, 2008 (ENS) - The latest scientific research conducted within three West Coast national marine sanctuaries is now displayed on a new website hosted by the National Oceanic and Atmospheric Administration, NOAA and enriched by nearly 100 contributing partners.

Read More...

Source:
http://us.rd.yahoo.com/dailynews/rss/search/%22National+Marine+Sanctuary%22/SIG=11uabbith/*http%3A//www.ens-newswire.com/ens/apr2008/2008-04-29-094.asp

$63 M committed to preserve Asia's Coral Triangle (Philstar.com)

Yahoo! Coral Reefs News
April 29, 2008 04:14 PM

An international fund that aids sustainable environment projects has committed $63 million (euro40 million) to help preserve Southeast Asiaâ€™s Coral Triangle from overfishing and climate change, the Asian Development Bank (ADB) said Tuesday.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=12ju90dnv/*http%3A//www.philstar.-com/scripts/articles.php?%26aid%3D20080429193%26type%3D2%26

Will Corals Survive The Stormy Future?

ScienceDaily: Coral Reef News
April 29, 2008 09:00 AM

Hurricanes and storms limit the ability of corals in Belize to "recruit" new coral into their communities, according to a new study in Marine Environmental Research. Coral reefs --- which can grow to be thousands of years old --- form and grow when free-swimming coral larvae in the ocean attach to rocks or other hard surfaces and begin to develop. Intense storms can wipe out this "recruitment" process.

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Source:
http://www.sciencedaily.com/releases/2008/04/080428140002.htm

In Rangiroa, shades of Polynesia past (Miami Herald)

Yahoo! Coral Reefs News
April 29, 2008 07:28 AM

Twice a day the tide changes on this South Seas atoll, and when it does, 8- to 12-foot-tall waves churn through Tiputa Pass, creating a thunder of clashing water, riptides and whirlpools that can kill an unwary swimmer. But the bottlenose dolphins of Rangiroa revel in it. Twice a day, the pass becomes their playground, a place to soar and dive and frolic.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=11kg0aak6/*http%3A//www.miamiherald.com/986/story/512831.html

Chambersburg elementary students become adventurers on Author Day (Public Opinion)

Yahoo! Coral Reefs News
April 29, 2008 06:09 AM

Coldbrook Elementary School students went on a coral reef adventure Monday with an award-winning author of 40 books. Nature/educational writer Toni Albert introduced students to wildlife, wild lands and the importance of preserving forests and oceans.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=11hlupret/*http%3A//www.publicopinionline.com/ci_9089459

Endangered Right Whales Protected With New Warning Buoys In Shipping Lanes (Science Daily)

National Marine Sanctuary in the News
April 28, 2008 11:14 PM

Endangered North Atlantic right whales are safer along Massachusetts Bay's busy shipping lanes this spring, thanks to a new system of smart buoys. The buoys recognize whales' distinctive calls and route the information to a public Web site and a marine warning system, giving ships the chance to avoid deadly collisions.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/%22National+Marine+Sanctuary%22/SIG=121gquthi/*http%3A//www.sciencedaily.com/releases/2008/04/080428104518.htm

Will Corals Survive Stormy Future? (Newswise)

Yahoo! Coral Reefs News
April 28, 2008 06:23 PM

Earthwatch-supported study reveals that climate change-related storms limit the number of coral recruits that enter a coral community.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=11pbv0aig/*http%3A//www.newswise.com/articles/view/540186/?sc=rssn

Guam's Wastewater Troubles....There are Solutions (Pacific Daily News)

Yahoo! Coral Reefs News
April 28, 2008 02:44 PM

In the Monday April 28, 2008 Opinion page of PDN, Joe Murphy's "Murphy's Law" gives readers a down to earth, common sense approach to Guam's issues with regards to labor, business development, infrastructure expansion needs, and utilization of innovative technology to help conserve energy on Guam.

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http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=120nmbkab/*http%3A//www.guampdn.com/apps/pbcs.dll/article?AID=/20080428/NEIGHBORHOODS01/804280326

Whale-watching boats are putting whales in jeopardy, study says (Boston Globe)

National Marine Sanctuary in the News
April 28, 2008 08:05 AM

In the lush waters of Stellwagen Bank National Marine Sanctuary, whale watching is one of the region's most beloved - and jaw-dropping - experiences. When one of the animals is spotted in the dark, cold waters, boats filled with awestruck tourists make a beeline to watch the leviathan feed and, if luck is with them, breach.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/%22National+Marine+Sanctuary%22/SIG=13pah48bs/*http%3A//www.boston.com/news/science/articles/2008/04/28/whale_watching_boats_are_putting_whales_in_jeopardy_study_says

Local sights make it to New 7 Wonders of Nature shortlist (Yehey!)

Yahoo! Coral Reefs News
April 28, 2008 07:13 AM

Itâ€™s not only YouTube sensations Charice Pempengco and Arnel Pineda who can bring glory to the Philippines through the Internet.

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http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=11ns2k8fk/*http%3A//www.yehey.com/travel/articles.aspx?id=211827

Arroyo promotes 3 natural wonders in RP (Sun Star)

National Marine Sanctuary in the News
April 27, 2008 04:08 PM

"LET'S vote online for our natural wonders."

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/%22National+Marine+Sanctuary%22/SIG=135r1gihk/*http%3A//www.sunstar.com.ph/static/dum/2008/04/28/news/arroyo.promotes.3.natural.wonders.in.rp.html

Comments sought on plans for marine national monument (The Garden Island)

Yahoo! Coral Reefs News
April 27, 2008 11:28 AM

In celebration of Earth Day on Tuesday, Gov. Linda Lingle announced the availability of the Papahanaumokuakea Marine National Monument Draft Management Plan for public review and comment.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=121vkdt79/*http%3A//www.kauaiworld.com/articles/2008/04/27/news/news02.txt

Into the Blue: Diving south of Kewalo Basin (Honolulu Star-Bulletin)

Yahoo! Coral Reefs News
April 27, 2008 11:25 AM

A malevolent-looking eel peers out from a temporary hiding spot. Starfish crowd a section of the seabed like conventioneers. Colorful clownfish dart in and out of barnacle-covered bulkheads.

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=11qg7r8kn/*http%3A//starbulletin.com/2008/04/27/travel/story01.html

Defy the Typical Caribbean Vacation (Carteret County News-Times)

Yahoo! Coral Reefs News
April 27, 2008 05:14 AM

(ARA) - When you think of the Caribbean, the first things to come to mind are probably the sunny skies, warm tropical breezes and white sandy beaches; but Doris Pfister of Orlando, Fla., thinks you'd be even more impressed by what you don't see.

Read More...

Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=12ckstgje/*http%3A//www.carteretnewstimes.com/articles/2008/04/27/ara/travel/1240.txt

Tubbataha Dreams (Philippine Daily Inquirer)

Yahoo! Coral Reefs News
April 26, 2008 10:59 PM

MANILA, Philippines - Can we make it happen? Can our very own natural wonder - Tubbataha - be recognized as one of the seven new wonders of nature around the world?

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Source:
http://us.rd.yahoo.com/dailynews/rss/search/coral+reef/SIG=12l2ciftp/*http%3A//showbizandstyle.inquirer.net/sim/sim/view/20080427-132980/Tubbataha-Dreams

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Published April 2008, Advanced Aquarist's Online Magazine.

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At AquaCave, we offer a large selection of aquarium supplies for both, freshwater and saltwater enthusiasts. The prices and quality of our aquarium equipment keep our customers coming back. We stock thousands of aquarium supplies such as protein skimmers, air pumps, water pumps and power heads, full line of CO_2 equipment, calcium reactors, aquarium lighting, fish food, refugiums, aquarium filters, heaters, and much more. New items are added daily so please visit us often to get the latest high quality products at great prices.

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HelloLights has been in business since 1997 providing the aquarium industry with high quality lighting products and accessories. Throughout the years, our mission has been to be the aquarium hobbyist? one stop source for all of their lighting needs. With unsurpassed customer service and high quality products, we truly believe we are the clear choice for aquarium lighting. We realize that lighting is one of the major purchases that the hobbyist will make when setting up an aquarium, and we take great pride in our role in this process.

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Premium Aquatics is a family owned and operated aquarium business. We have been in business since April 1996 and we are dedicated to serving the aquarium hobbyist. Our mission is to bring you the highest quality aquarium products and livestock available and at a reasonable price and to provide honest non-bias information on all of our products and our competitors. Our goal is customer satisfaction, we want your return business.

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AquaC, Inc. was founded in 1998 as a small one-man operation that focused on providing exceptional products and stellar customer service. Since that time, the company has rapidly developed into one of the fastest growing marine filtration manufacturer's in the industry. Although we now offer a variety of product lines and manufacture thousands of units each year, our focus remains the same - quality products and top-notch customer service.

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Reef Nutrition Marine Live Feeds are produced by Reed Mariculture, the world's largest producer of marine microalgae concentrates. We supply algal feeds and zooplankton to universities, marine ornamental growers, and over 500 fish, shrimp, and shellfish hatcheries in 70+ countries around the world.

Southern California Caulerpa Action Team

An important goal of the Southern California Caulerpa Action Team is the detection of undiscovered infestations of C. taxifolia or other invasive species of Caulerpa, and the prevention of their spread.

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Sunlight Supply Inc. is a manufacturer and importer of High Intensity Discharge (H.I.D.) and fluorescent lighting fixtures. We specialize in fixtures with applications in the hobby & commercial horticulture and reef tank aquarium industries. Sunlight Supply Inc. is a recognized and respected leading brand in the marketplace.

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"www.reefs.org - If you had to pick a "one-stop shop" for everything online for reefs, this would be it. If you can't find it here, you can't find it." – Richard Sexton, Tropical Fish Hobbyist, November, 2002

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